

Applicants : Ian A. McCabe, Hamid Habibi, Desaraju V. Varaprasad
and Niall R. Lynam
Serial No. : 10/528,269
Page : 5

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the present application:

1 (canceled).

2 (previously presented): The mirror assembly of claim 10, wherein said at least one preselected spectral band comprises a preselected band of visible light, said radiant energy emitting element being operable to emit visible radiant energy with a peak intensity within said preselected spectral band of visible light.

3 (previously presented): The mirror assembly of claim 10, wherein said at least one preselected spectral band comprises a preselected band of near infrared radiant energy, said radiant energy emitting element being operable to emit near infrared radiant energy with a peak intensity within said preselected spectral band of near infrared radiant energy.

4 (previously presented): A mirror assembly for a vehicle, said mirror assembly comprising:
a mirror element comprising at least one substrate having a forward surface facing towards a viewer of the mirror assembly and a rearward surface facing away from a viewer of the mirror assembly, said mirror element comprising at least one substantially reflective metallic layer sandwiched between a respective pair of substantially transparent non-metallic layers, each of said substantially transparent non-metallic layers and said substantially reflective metallic layer having a selected refractive index and a selected physical thickness such that said mirror element is selectively spectrally tuned to substantially transmit at least one preselected spectral band of radiant energy therethrough while substantially reflecting other radiant energy, wherein

Applicants : Ian A. McCabe, Hamid Habibi, Desaraju V. Varaprasad
and Niall R. Lynam
Serial No. : 10/528,269
Page : 6

said at least one preselected spectral band comprises a preselected band of near infrared radiant energy;

a radiant energy emitting element at or near said rearward surface of said at least one substrate, said radiant energy emitting element being operable to emit radiant energy towards said rearward surface and through said mirror element, said radiant energy emitting element being operable to emit near infrared radiant energy with a peak intensity within said preselected spectral band of near infrared radiant energy;

an imaging sensor at or near said rearward surface, said imaging sensor being sensitive to near infrared radiant energy in the range of approximately 750 nm to approximately 1100 nm.

5 (previously presented): A mirror assembly for a vehicle, said mirror assembly comprising:

a mirror element comprising at least one substrate having a forward surface facing towards a viewer of the mirror assembly and a rearward surface facing away from a viewer of the mirror assembly, said mirror element comprising at least one substantially reflective metallic layer sandwiched between a respective pair of substantially transparent non-metallic layers, each of said substantially transparent non-metallic layers and said substantially reflective metallic layer having a selected refractive index and a selected physical thickness such that said mirror element is selectively spectrally tuned to substantially transmit at least one preselected spectral band of radiant energy therethrough while substantially reflecting other radiant energy; and

a radiant energy emitting element at or near said rearward surface of said at least one substrate, said radiant energy emitting element being operable to emit radiant energy towards said rearward surface and through said mirror element, said radiant energy emitting element being operable to emit radiant energy with a peak intensity within said at least one preselected spectral band, wherein said at least one preselected spectral band comprises first and second preselected bands of radiant energy, said radiant energy emitting element comprises first and second radiant energy emitting elements, said first radiant energy emitting element being operable to emit

Applicants : Ian A. McCabe, Hamid Habibi, Desaraju V. Varaprasad
and Niall R. Lynam
Serial No. : 10/528,269
Page : 7

radiant energy with a peak intensity within said first preselected spectral band of radiant energy and said second radiant energy emitting element being operable to emit radiant energy with a peak intensity within said second preselected spectral band of radiant energy.

6 (original): The mirror assembly of claim 5, wherein said first and second preselected bands of radiant energy comprise first and second preselected bands of visible light, said first band being a different band than said second band.

7 (original): The mirror assembly of claim 5, wherein said first preselected band of radiant energy comprises a band of near infrared radiant energy and said second preselected band of radiant energy comprises a band of visible light.

8 (previously presented): A mirror assembly for a vehicle, said mirror assembly comprising:

a mirror element comprising at least one substrate having a forward surface facing towards a viewer of the mirror assembly and a rearward surface facing away from a viewer of the mirror assembly, said mirror element comprising at least one substantially reflective metallic layer sandwiched between a respective pair of substantially transparent non-metallic layers, each of said substantially transparent non-metallic layers and said substantially reflective metallic layer having a selected refractive index and a selected physical thickness such that said mirror element is selectively spectrally tuned to substantially transmit at least one preselected spectral band of radiant energy therethrough while substantially reflecting other radiant energy; and

a radiant energy emitting element at or near said rearward surface of said at least one substrate, said radiant energy emitting element being operable to emit radiant energy towards said rearward surface and through said mirror element, said radiant energy emitting element being operable to emit radiant energy with a peak intensity within said at least one preselected spectral band, wherein said mirror element comprises at least two substantially reflective metallic layers,

Applicants : Ian A. McCabe, Hamid Habibi, Desaraju V. Varaprasad
and Niall R. Lynam
Serial No. : 10/528,269
Page : 8

each of said at least two substantially reflective metallic conductive layers being sandwiched between a respective pair of substantially transparent non-metallic layers.

9 (previously presented): The mirror assembly of claim 10 including an anti-reflective stack of layers at said rearward surface, said anti-reflective stack being spectrally tuned to minimize reflectance of radiant energy at said preselected spectral band.

10 (previously presented): A mirror assembly for a vehicle, said mirror assembly comprising:

a mirror element comprising at least one substrate having a forward surface facing towards a viewer of the mirror assembly and a rearward surface facing away from a viewer of the mirror assembly, said mirror element comprising at least one substantially reflective metallic layer sandwiched between a respective pair of substantially transparent non-metallic layers, each of said substantially transparent non-metallic layers and said substantially reflective metallic layer having a selected refractive index and a selected physical thickness such that said mirror element is selectively spectrally tuned to substantially transmit at least one preselected spectral band of radiant energy therethrough while substantially reflecting other radiant energy;

wherein said at least one substrate comprises first and second substrates, said first substrate having said forward surface and a second surface opposite said forward surface, said second substrate having said rearward surface and a third surface opposite said rearward surface, said first and second substrates being arranged so that said second surface opposes said third surface, said mirror element comprising an electrochromic medium disposed between said first and second substrates; and

a radiant energy emitting element at or near said rearward surface of said at least one substrate, said radiant energy emitting element being operable to emit radiant energy towards said rearward surface and through said mirror element, said radiant energy emitting element being

Applicants : Ian A. McCabe, Hamid Habibi, Desaraju V. Varaprasad
and Niall R. Lynam
Serial No. : 10/528,269
Page : 9

operable to emit radiant energy with a peak intensity within said at least one preselected spectral band.

11 (original): The mirror assembly of claim 10, wherein said substantially transparent non-metallic layers and said substantially reflective metallic layer are disposed between said electrochromic medium and said third surface, wherein said mirror element comprises a transfective reflector at said third surface.

12 (original): The mirror assembly of claim 10, wherein said substantially transparent non-metallic layers and said substantially reflective metallic layer are disposed at said rearward surface of said second substrate, wherein said mirror element comprises a fourth surface reflective element.

13 (original): The mirror assembly of claim 10, wherein said substantially transparent non-metallic layers comprise substantially transparent semi-conductive non-metallic layers and said substantially reflective metallic layer comprises a substantially reflective conductive metallic layer.

14 (original): The mirror assembly of claim 13, wherein said substantially transparent semi-conductive non-metallic layers and said substantially reflective conductive metallic layer conduct electricity to darken or color said electrochromic medium in response to a voltage being applied to said layers.

15 (previously presented): The mirror assembly of claim 8, wherein said at least one substrate comprises a single substrate, said substantially transparent non-metallic layers and said

Applicants : Ian A. McCabe, Hamid Habibi, Desaraju V. Varaprasad
and Niall R. Lynam
Serial No. : 10/528,269
Page : 10

substantially reflective metallic layer being disposed at said rearward surface of said single substrate.

16 (original): The mirror assembly of claim 15, wherein said single substrate comprises a prismatic substrate.

17 (previously presented): A mirror assembly for a vehicle, said mirror assembly comprising:

a mirror element comprising at least one substrate having a forward surface facing towards a viewer of the mirror assembly and a rearward surface facing away from a viewer of the mirror assembly, said mirror element comprising at least one substantially reflective metallic layer sandwiched between a respective pair of substantially transparent non-metallic layers, each of said substantially transparent non-metallic layers and said substantially reflective metallic layer having a selected refractive index and a selected physical thickness such that said mirror element is selectively spectrally tuned to substantially transmit at least one preselected spectral band of radiant energy therethrough while substantially reflecting other radiant energy;

at least one adhesion enhancement and passivation layer disposed between said reflective metallic layer and at least one of said transparent non-metallic layers to increase the corrosion resistance of said reflective metallic layer and to enhance the adhesion and the mechanical stability of said reflective metallic layer; and

a radiant energy emitting element at or near said rearward surface of said at least one substrate, said radiant energy emitting element being operable to emit radiant energy towards said rearward surface and through said mirror element, said radiant energy emitting element being operable to emit radiant energy with a peak intensity within said at least one preselected spectral band.

18 (canceled).

Applicants : Ian A. McCabe, Hamid Habibi, Desaraju V. Varaprasad
and Niall R. Lynam
Serial No. : 10/528,269
Page : 11

19 (previously presented): The electrochromic mirror assembly of claim 27, wherein said transflective reflector provides at least 20 percent transmissivity of light at or near said emitted spectral characteristic.

20 (previously presented): The electrochromic mirror assembly of claim 27, wherein said transflective reflector provides at least 10 percent transmissivity of light at or near said emitted spectral characteristic.

21 (original): The electrochromic mirror assembly of claim 20, wherein said transflective reflector provides at least 60 percent photopic reflectance of other light.

22 (original): The electrochromic mirror assembly of claim 20, wherein said transflective reflector provides at least 70 percent photopic reflectance of other light.

23 (original): The electrochromic mirror assembly of claim 20, wherein said transflective reflector provides at least 80 percent photopic reflectance of other light.

24 (previously presented): An electrochromic mirror assembly for a vehicle, said mirror assembly comprising:

an electrochromic mirror element comprising a first substrate having first and second surfaces and a second substrate having third and fourth surfaces, said first and second substrates being arranged so that said second surface opposes said third surface with an electrochromic medium disposed therebetween;

said third surface of said second substrate comprising a transflective reflector comprising a first substantially transparent semi-conductive non-metallic layer contacting the electrochromic

Applicants : Ian A. McCabe, Hamid Habibi, Desaraju V. Varaprasad
and Niall R. Lynam
Serial No. : 10/528,269
Page : 12

medium, a second substantially transparent semi-conductive non-metallic layer, and a substantially reflecting metallic conductive layer sandwiched between said first and second substantially transparent semi-conductive non-metallic layers, wherein when said mirror element is viewed from outside said first surface, said mirror element is substantially spectrally untinted when no voltage is applied across said electrochromic medium, said mirror element being at least partially spectrally selective in transmission and exhibiting a spectrally selective transmission characteristic, said spectrally selective transmission characteristic being established by the refractive indices and physical thicknesses of said first and second substantially transparent semi-conductive non-metallic layers and said substantially reflective metallic conductive layer; and
a light emitting element disposed at said fourth surface of said second substrate and operable to emit light having an emitted spectral characteristic through said mirror element, wherein said transflective reflector is configured to exhibit a spectrally selective transmission characteristic so as to substantially transmit light having a spectral band in regions at or near said emitted spectral characteristic and to substantially reflect other light having a spectral band outside of said regions, wherein said transflective reflector provides at least 15 percent transmissivity of light at or near said emitted spectral characteristic and provides at least 60 percent photopic reflectance of other light.

25 (previously presented): The electrochromic mirror assembly of claim 27, wherein said transflective reflector provides at least 30 percent transmissivity of light at or near said emitted spectral characteristic and provides at least 60 percent photopic reflectance of other light.

26 (previously presented): The electrochromic mirror assembly of claim 24, wherein said second substantially transparent semi-conductive non-metallic layer contacts said third surface of said second substrate.

Applicants : Ian A. McCabe, Hamid Habibi, Desaraju V. Varaprasad
and Niall R. Lynam
Serial No. : 10/528,269
Page : 13

27 (previously presented): An electrochromic mirror assembly for a vehicle, said mirror assembly comprising:

an electrochromic mirror element comprising a first substrate having first and second surfaces and a second substrate having third and fourth surfaces, said first and second substrates being arranged so that said second surface opposes said third surface with an electrochromic medium disposed therebetween;

said third surface of said second substrate comprising a transflective reflector, wherein said transflective reflector comprises at least two substantially reflective metallic conductive layers, each of said at least two substantially reflective metallic conductive layers being sandwiched between a respective pair of substantially transparent semi-conductive non-metallic layers disposed between said electrochromic medium and said second substrate, wherein when said mirror element is viewed from outside said first surface, said mirror element is substantially spectrally untinted when no voltage is applied across said electrochromic medium, said mirror element being at least partially spectrally selective in transmission and exhibiting a spectrally selective transmission characteristic, said spectrally selective transmission characteristic being established by the refractive indices and physical thicknesses of said substantially transparent semi-conductive non-metallic layers and said substantially reflective metallic conductive layer; and

a light emitting element disposed at said fourth surface of said second substrate and operable to emit light having an emitted spectral characteristic through said mirror element, wherein said transflective reflector is configured to exhibit a spectrally selective transmission characteristic so as to substantially transmit light having a spectral band in regions at or near said emitted spectral characteristic and to substantially reflect other light having a spectral band outside of said regions.

Applicants : Ian A. McCabe, Hamid Habibi, Desaraju V. Varaprasad
and Niall R. Lynam
Serial No. : 10/528,269
Page : 14

28 (original): The electrochromic mirror assembly of claim 27, wherein said transflective reflector substantially transmits light having said spectral band in the near infrared region of the spectrum, said light emitting element being operable to emit near infrared light through said transflective reflector.

29 (original): The electrochromic mirror assembly of claim 28 including an imaging sensor at said fourth surface that is operable to sense near infrared light.

30 (original): The electrochromic mirror assembly of claim 28, wherein said transflective reflector substantially transmits light having a second spectral band in a visible region of the spectrum, said mirror assembly including a second light emitting element at said fourth surface, said second light emitting element being operable to emit light that has a peak intensity at or near said second spectral band through said transflective reflector.

31 (original): The electrochromic mirror assembly of claim 27, wherein said transflective reflector substantially transmits light having said spectral band at a first visible region of the spectrum.

32 (original): The electrochromic mirror assembly of claim 31, wherein said transflective reflector substantially transmits light having a second spectral band in a second visible region of the spectrum, said mirror assembly including a second light emitting element at said fourth surface, said second light emitting element being operable to emit light that has a peak intensity at or near said second spectral band through said transflective reflector.

33 (canceled).

Applicants : Ian A. McCabe, Hamid Habibi, Desaraju V. Varaprasad
and Niall R. Lynam
Serial No. : 10/528,269
Page : 15

34 (currently amended): The electrochromic mirror assembly of claim ~~35~~ 37, wherein said first reflectivity is greater than said second reflectivity.

35 (previously presented): An electrochromic mirror assembly for a vehicle, said mirror assembly comprising:

an electrochromic mirror element comprising a first substrate having first and second surfaces and a second substrate having third and fourth surfaces, said first and second substrates being arranged so that said second surface opposes said third surface with an electrochromic medium disposed therebetween;

said third surface of said second substrate comprising at least one conductive metallic layer and at least one transparent, at least partially conductive layer, wherein said layers define first and second regions of said transfective reflector, said first region having a first reflectivity and a first transmissivity and said second region having a second reflectivity and a second transmissivity, said second transmissivity being greater than said first transmissivity, said first reflectivity being greater than said second reflectivity, wherein said first reflectivity comprises at least approximately 60 percent; and

a display element positioned at said fourth surface of said second substrate and operable to transmit light through said second region of said transfective reflector.

36 (previously presented): The electrochromic mirror assembly of claim 35, wherein said first region comprises a generally central region of said electrochromic mirror element and said second region comprises at least one side region of said electrochromic mirror element.

Applicants : Ian A. McCabe, Hamid Habibi, Desaraju V. Varaprasad
and Niall R. Lynam
Serial No. : 10/528,269
Page : 16

37 (previously presented): An electrochromic mirror assembly for a vehicle, said mirror assembly comprising:

an electrochromic mirror element comprising a first substrate having first and second surfaces and a second substrate having third and fourth surfaces, said first and second substrates being arranged so that said second surface opposes said third surface with an electrochromic medium disposed therebetween;

said third surface of said second substrate comprising at least one conductive metallic layer and at least one transparent, at least partially conductive layer, wherein said layers define first and second regions of said transfective reflector, said first region having a first reflectivity and a first transmissivity and said second region having a second reflectivity and a second transmissivity, said second transmissivity being greater than said first transmissivity, wherein said transfective reflector comprises a first substantially transparent semi-conductive layer contacting the electrochromic medium, a second substantially transparent semi-conductive layer, and a substantially reflecting metallic conductive layer sandwiched between said first and second substantially transparent semi-conductive layers; and

a display element positioned at said fourth surface of said second substrate and operable to transmit light through said second region of said transfective reflector.

38 (original): The electrochromic mirror assembly of claim 37, wherein a thickness of at least one of said layers is varied between said first and second regions.

39 (original): The electrochromic mirror assembly of claim 38, wherein each of said first and second transparent semi-conductive layers and said substantially reflective metallic conductive layer of said second region have a selected refractive index and a selected physical thickness such that said transfective reflector is selectively spectrally tuned to substantially transmit at least one preselected spectral band of light therethrough while substantially reflecting other light, said

Applicants : Ian A. McCabe, Hamid Habibi, Desaraju V. Varaprasad
and Niall R. Lynam
Serial No. : 10/528,269
Page : 17

display element being operable to transmit light with a peak intensity within said preselected spectral band through said second region of said transfective reflector.

40 (canceled).

41 (previously presented): The mirror assembly of claim 48, wherein said at least one preselected spectral band comprises a preselected band of visible light, said radiant energy emitting element being operable to emit visible radiant energy with a peak intensity within said preselected spectral band of visible light.

42 (original): The mirror assembly of claim 41, wherein said radiant energy emitting element comprises a display on demand element.

43 (previously presented): The mirror assembly of claim 48, wherein said at least one preselected spectral band comprises a preselected band of near infrared radiant energy, said radiant energy emitting element being operable to emit near infrared radiant energy with a peak intensity within said preselected spectral band of near infrared radiant energy.

44 (previously presented): A mirror assembly for a vehicle, said mirror assembly comprising:
a mirror element comprising a substrate having a forward surface facing towards a viewer of the mirror assembly and a rearward surface facing away from a viewer of the mirror assembly, said mirror element comprising at least one substantially reflective metallic layer sandwiched between a respective pair of substantially transparent non-metallic layers disposed at said rearward surface of said substrate, each of said substantially transparent non-metallic layers and said substantially reflective metallic layer having a selected refractive index and a selected physical thickness such that said mirror element is selectively spectrally tuned to substantially

Applicants : Ian A. McCabe, Hamid Habibi, Desaraju V. Varaprasad
and Niall R. Lynam
Serial No. : 10/528,269
Page : 18

transmit at least one preselected spectral band of radiant energy therethrough while substantially reflecting other radiant energy, wherein said at least one preselected spectral band comprises a preselected band of near infrared radiant energy;

a radiant energy emitting element at or near said rearward surface of said substrate, said radiant energy emitting element being operable to emit radiant energy towards said rearward surface and through said mirror element, said radiant energy emitting element being operable to emit near infrared radiant energy with a peak intensity within said preselected spectral band of near infrared radiant energy; and

an imaging sensor at or near said rearward surface, said imaging sensor being sensitive to near infrared radiant energy in the range of approximately 750 nm to approximately 1100 nm.

45 (previously presented): A mirror assembly for a vehicle, said mirror assembly comprising:

a mirror element comprising a substrate having a forward surface facing towards a viewer of the mirror assembly and a rearward surface facing away from a viewer of the mirror assembly, said mirror element comprising at least one substantially reflective metallic layer sandwiched between a respective pair of substantially transparent non-metallic layers disposed at said rearward surface of said substrate, each of said substantially transparent non-metallic layers and said substantially reflective metallic layer having a selected refractive index and a selected physical thickness such that said mirror element is selectively spectrally tuned to substantially transmit at least one preselected spectral band of radiant energy therethrough while substantially reflecting other radiant energy; and

a radiant energy emitting element at or near said rearward surface of said substrate, said radiant energy emitting element being operable to emit radiant energy towards said rearward surface and through said mirror element, said radiant energy emitting element being operable to emit radiant energy with a peak intensity within said at least one preselected spectral band, wherein said at least one preselected spectral band comprises first and second preselected bands

Applicants : Ian A. McCabe, Hamid Habibi, Desaraju V. Varaprasad
and Niall R. Lynam
Serial No. : 10/528,269
Page : 19

of radiant energy, said radiant energy emitting element comprises first and second radiant energy emitting elements, said first radiant energy emitting element being operable to emit radiant energy with a peak intensity within said first preselected spectral band of radiant energy and said second radiant energy emitting element being operable to emit radiant energy with a peak intensity within said second preselected spectral band of radiant energy.

46 (original): The mirror assembly of claim 45, wherein said first and second preselected bands of radiant energy comprise first and second preselected bands of visible light, said first band being a different band than said second band.

47 (original): The mirror assembly of claim 45, wherein said first preselected band of radiant energy comprises a band of near infrared radiant energy and said second preselected band of radiant energy comprises a band of visible light.

48 (previously presented): A mirror assembly for a vehicle, said mirror assembly comprising:
a mirror element comprising a substrate having a forward surface facing towards a viewer of the mirror assembly and a rearward surface facing away from a viewer of the mirror assembly, wherein said mirror element comprises at least two substantially reflective metallic layers, each of said at least two substantially reflective metallic conductive layers being sandwiched between a respective pair of substantially transparent non-metallic layers disposed at said rearward surface of said substrate, each of said substantially transparent non-metallic layers and said substantially reflective metallic layer having a selected refractive index and a selected physical thickness such that said mirror element is selectively spectrally tuned to substantially transmit at least one preselected spectral band of radiant energy therethrough while substantially reflecting other radiant energy; and

Applicants : Ian A. McCabe, Hamid Habibi, Desaraju V. Varaprasad
and Niall R. Lynam
Serial No. : 10/528,269
Page : 20

a radiant energy emitting element at or near said rearward surface of said substrate, said radiant energy emitting element being operable to emit radiant energy towards said rearward surface and through said mirror element, said radiant energy emitting element being operable to emit radiant energy with a peak intensity within said at least one preselected spectral band.

49 (previously presented): A mirror assembly for a vehicle, said mirror assembly comprising:

a mirror element comprising a substrate having a forward surface facing towards a viewer of the mirror assembly and a rearward surface facing away from a viewer of the mirror assembly, said mirror element comprising at least one substantially reflective metallic layer sandwiched between a respective pair of substantially transparent non-metallic layers disposed at said rearward surface of said substrate, each of said substantially transparent non-metallic layers and said substantially reflective metallic layer having a selected refractive index and a selected physical thickness such that said mirror element is selectively spectrally tuned to substantially transmit at least one preselected spectral band of radiant energy therethrough while substantially reflecting other radiant energy;

a radiant energy emitting element at or near said rearward surface of said substrate, said radiant energy emitting element being operable to emit radiant energy towards said rearward surface and through said mirror element, said radiant energy emitting element being operable to emit radiant energy with a peak intensity within said at least one preselected spectral band; and

an anti-reflective stack of layers at said rearward surface, said anti-reflective stack being spectrally tuned to minimize reflectance of radiant energy at said preselected spectral band.

50 (previously presented): A mirror assembly for a vehicle, said mirror assembly comprising:

a mirror element comprising a substrate having a forward surface facing towards a viewer of the mirror assembly and a rearward surface facing away from a viewer of the mirror assembly, wherein said substrate comprises a prismatic substrate, said mirror element comprising at least

Applicants : Ian A. McCabe, Hamid Habibi, Desaraju V. Varaprasad
and Niall R. Lynam
Serial No. : 10/528,269
Page : 21

one substantially reflective metallic layer sandwiched between a respective pair of substantially transparent non-metallic layers disposed at said rearward surface of said substrate, each of said substantially transparent non-metallic layers and said substantially reflective metallic layer having a selected refractive index and a selected physical thickness such that said mirror element is selectively spectrally tuned to substantially transmit at least one preselected spectral band of radiant energy therethrough while substantially reflecting other radiant energy; and

a radiant energy emitting element at or near said rearward surface of said substrate, said radiant energy emitting element being operable to emit radiant energy towards said rearward surface and through said mirror element, said radiant energy emitting element being operable to emit radiant energy with a peak intensity within said at least one preselected spectral band.